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27. (Amended) A system for interfacing with a voxel-based virtual object in a haptic virtual environment, the system comprising:

- a voxel-based virtual object comprising a virtual surface;
- a virtual tool for use by the user in the haptic virtual environment;
- a constraint geometry limiting the movement of the virtual tool in the haptic virtual environment;
- a haptic interface device, wherein the haptic interface device senses a position of the user in real space;
- a modeling application in communication with the haptic interface device, the voxel-based virtual object, and the virtual tool, wherein the modeling application determines a haptic interface location in the haptic virtual environment in response to the location of the user in real space; determines a position of the virtual tool in the haptic virtual environment in comparison to the haptic interface location, and the location of the virtual surface and the constraint geometry; and constraining an action of the virtual tool based on (i) the constraint geometry, (ii) the virtual surface, and (iii) the position of the virtual tool, and (iv) the haptic interface location.